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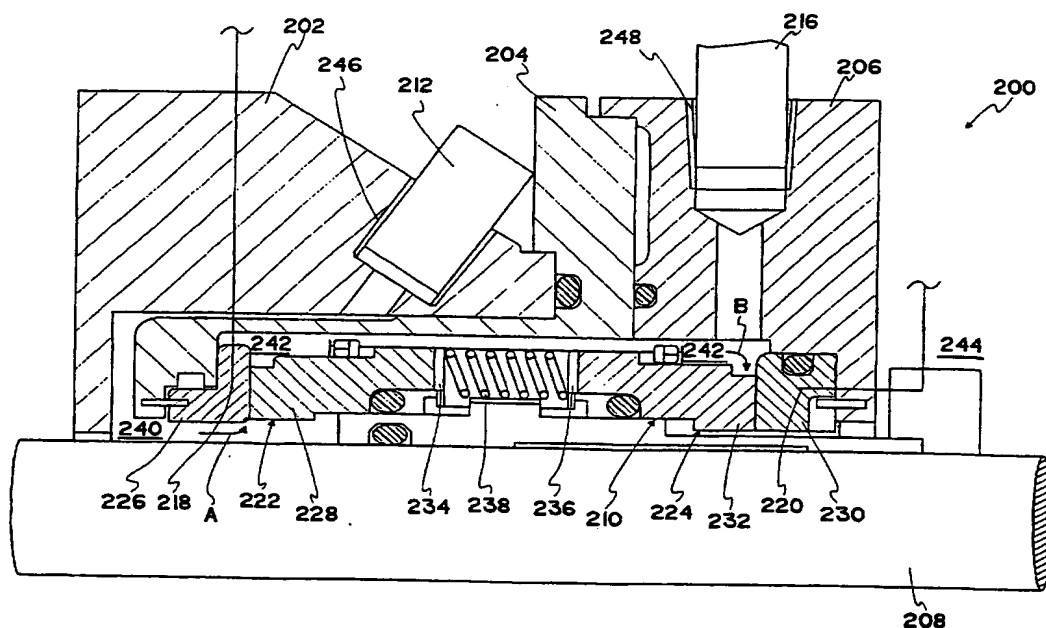
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(54) Title: **MONITORING SEAL SYSTEM**



(57) Abstract: A monitoring seal system (200) comprises a seal housing (202), a seal assembly (210), a temperature sensor (212) and a controller. The seal assembly sealingly engages a rotary shaft (208) to prevent fluid leakage between the shaft and the housing. The seal assembly has at least one seal. The seal has a primary ring (228) and a mating ring (226). The temperature sensor senses the temperature in the vicinity of the seal. The controller determines whether an upset condition has occurred based on at least the temperature in the vicinity of the seal.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/32991

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F16J 15/34

US CL : 277/317

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 277/317, 318, 319

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-------------|--|--|
| X — Y | US 4,691,276 A (MILLER ET AL) 01 September 1987 (01.09.1987), see entire document. | 1-6, 11, 14-17, 33 and 34 |
| Y | US 5,762,342 A (KAKABAKER ET AL) 09 June 1998 (09.06.1998), see element (70a) and the description thereof. | 7-10, 12, 13, 18-24, 31, 32 and 35-38 12 and 13 |
| Y | US 5,076,589 A (MARSI) 31 December 1991 (31.12.1991), see element (76) and the description thereof. | 7-10 and 18-20 |
| Y | US 5,755,372 A (CIMBURA, SR.) 26 May 1998 (26.05.1998), see entire document. | 21-27 and 29-32 |
| Y | US 3,392,983 A (HAJNER) 16 July 1968 (16.07.1968), see entire document. | 25-27 |
| Y | US 5,412,977 A (SCHMOHL ET AL) 09 May 1995 (09.05.1995), see abstract and col. 4, lines 50-59. | 35-38 |
| A | US 2,834,619 A (McNAB) 13 May 1958 (13.05.1958), see entire document. | 1 |
| A | US 3,297,329 A (SMITH ET AL) 10 January 1967 (10.01.1967), see entire document. | 1 |

☒ Further documents are listed in the continuation of Box C.

See patent family annex.

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International application No.

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | US 3,700,247 A (BUTLER ET AL) 24 October 1972 (24.10.1972), see elements (90) and (91) and the description thereof. | 1 |